

THE TAXONOMIC ARRANGEMENT OF THE PHASMATODEA WITH KEYS TO THE SUBFAMILIES AND TRIBES

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ABSTRACT—Keys are presented for the six families, seventeen subfamilies, and thirty-three tribes of Phasmatodea. Lists of genera, synonymies and type-genera are given for each subfamily and tribe.

The Phasmatodea have been less studied than any other order of the Orthopteroidea, are usually referred to as a 'minor order' and have not been monographed in recent years. This paper is an attempt to assist entomologists with the classification of the group by supplying keys to the six families, seventeen subfamilies and thirty-three tribes, for which we give a list of genera, synonymies and type-genera.

We have not settled all the difficulties involved in the taxonomic study of the group, on the contrary there are still problems. Authors disagree as to the position of certain genera in the family-group taxa, and they do not even fully agree on their names or taxonomic limits. The literature of this order also reveals the lack of definite conclusions as to the validity of certain species and genera. There exists a diversity of opinion as to the proper names of certain genera. In this paper lists of genera are given for each subfamily and tribe, but it is not our intent to positively place all the genera in subfamilies or tribes.

Stick insects were first described as Gryllidae and Mantidae by Drury (1773). Latreille (1825) proposed them as a family, now equivalent to an order, using the vernacular name spectra for them. He introduced four genera (*Phillie*, *Plasma*, *Bacterie*, *Bacille*) none of which were cited by a latin name, but which included all the known stick insects. Various names such as *Phasmida*, *Cheleutoptera* and *Phasmodea* were used for this group. Jacobson and Bianchi (1902) introduced the present term *Phasmatodea*.

The outstanding work on the classification of stick insects by Brunner v. Wattenwyl and Redtenbacher (1906–1908) is considered a virtual starting point for work on this group. It includes keys to fourteen tribes and to many genera and species. The inadequacy of their work stems from the large number of bibliographical errors.

¹The death of Professor J. C. Bradley on February 25, 1975, left this paper in preparation. For more than a year before his death I helped him with the bibliographical research and late in 1975 I took it on myself to bring this paper to print.

Some of the problems of their work are pointed out by Dohrn (1910), Hebard (1919) and Karny (1923).

Karny (1923) believed that the rules of nomenclature require that the type-genus of each subfamily or tribe must be the oldest contained genus (this is not the case; see International Code Article 64). He therefore attempted to replace many previously established subfamily and tribal names with others that accorded with his view. On this account one must use caution in adopting the family-group names that he employed.

We follow the classification of Dr. Klaus Günther (1953) below the family level, but in reverse sequence, in order to commence with the least specialised, as is customary in phylogenetic treatments. Günther's classification is current and generally accepted. Changes that we have introduced concern nomenclature, only rarely taxonomy. Those genera that Günther mentioned remain where he placed them. Our placement of other genera is based on their descriptions in the literature and complies with the geographical and anatomical divisions set by Günther.

Kristensen (1975) discussed the systematic position of the Phasmatodea, i.e., whether they are a subordinate taxon within the Orthoptera, an isolated group or members of a taxon comprising also Orthoptera. Workers in the past have suggested each of these three different points of view. Burmeister (1838) treated them as a family of the order Orthoptera. Ragge (1955) considered them to be a very isolated group. Beier (1955) and Hennig (1969) considered the Phasmatodea as an order of the superorder Orthopteroidea.

Stål (1875b) divided the order into two major groups according to whether the insects possess areola² or not but did not give names to them. Redtenbacher (1906) named them "Areolatae" and "Anareolatae". Karny (1923), Günther (1953) and Beier (1957) named them Phyllidae and Phasmatidae. We use Redtenbacher's terms and recognize them herein as suborders. Sharov (1968) presented a different division of the order Phasma Phasmatodea. He included two superfamilies, the Xiphopteria represented by fossils and the Chresmodidea represented by the extinct family Chresmididae, and the recent families Phasmatidae and Phyllidae. More fossil material will hopefully supply conclusive evidence.

ORDER PHASMATODEA

Phasmida Leach, 1814–1817:1815.

Phasmodea Burmeister 1838: 553,561.

² Areola—A sharply defined, approximately triangular region situated apically on the meso- and metatibiae. Also called "areola apically tibiarum" by Stål and "area apicalis" by Günther.

Phasmatoidea Jacobson and Bianchi, 1902:59; Kevan, 1952:472-485; Günther, 1953:541; Hennig, 1969.
 Gressoria Brunner, 1915:195-281.
 Cheleutoptera, Phasmida Crampton, 1939:172.

KEY TO THE FAMILIES OF PHASMATODEA

1. Middle and hind tibiae with sunken areola on underside of apices Suborder Areolatae 3
- Middle and hind tibiae without sunken areola on underside of apices Suborder Anareolatae 2
2. Antennae filiform and indistinctly segmented, especially beyond middle, longer than fore femora and often longer than body length; if shorter than fore femora and distinctly jointed, then ventral edge of all femora smooth; ventral carina of middle and hind femora not evenly serrated, usually only with few distal teeth or unarmed Heteronemiidae
- Antennae powerful and distinctly segmented, usually shorter than fore femora, and then female femora are distinctly serrated dorsobasally, or longer than fore femora, but never as long as body, and then ventral carina of middle and hind femora distinctly and evenly serrated Phasmatidae
3. Tarsi clearly 5-segmented 4
- Tarsi apparently 3-segmented; complete mesonotum not more closely attached to the metanotum than to succeeding tergum; legs so attached ventrally that coxae cannot be seen from above; apterous; tarsal claws slightly asymmetrical; large arolium produced as far as apex of longer tarsal claw Timematidae
4. First abdominal segment as long as or longer than metanotum and fused with it 5
- First abdominal segment shorter than metanotum and not fused with it; apterous Bacillidae
5. Antennae long in both sexes; metanotum longer than wide, not leaf-like; margins of abdomen without lateral outgrowths Pseudophasmatidae
- Antennae of female barely as long as head, those of male longer and bristly; metanotum not longer than wide; leaf-like, margins of abdomen strongly foliaceous dilated; leaf-like dilations also on femora and sometimes tibiae; elytra of female covering almost entire abdomen, those of male scarcely longer than thorax Phyllidae

SUBORDER ANAREOLATAE

FAMILY HETERONEMIIDAE

Phasmodea Burmeister, 1838:561.
 Bacimelidae Brunner, 1893:80.
 Heteroneiniinae Rehn, 1904a:47.

Heteronemia having been established as the type-genus for a family group, Heteronemiidae (Heteroneminac Rehn, 1904a:47), Kirby (1904a) was not at liberty to change the nominal type-genus to

Diapheromera thereby intending to replace the name Heteronemidae with Diapheromeridae.

Rehn (1904a:53) showed that *Bacunculus* Burmeister (1838) is a junior synonym of *Heteronemia* Gray. Brunner (1893) established the family-group name Bacunculidae, but from the preceding, it follows that the family, subfamily and tribal names, each must have the nominal genus *Heteronemia* as its type-genus.

KEY TO THE SUBFAMILIES OF HETERONEMIDAE

1. Antennae distinctly segmented, usually shorter than fore femora, never as long as body; in those with long antennae ventral carina of posterior femora finely serrated and insects are winged, or their mesonotum is at least as long as metanotum 2
- Antennae filiform and indistinctly segmented, especially beyond middle, longer than fore femora, often longer than body length; ventral carina of 4 posterior femora not evenly serrated, usually only with few distal teeth or completely unarmed; mostly wingless; thin, stick-like animals 3
2. Antennae usually shorter, shorter than fore femora; ventral edge of posterior femora unarmed Pachymorphinae
- Antennae longer than fore femora; ventrolateral edge of posterior femora finely serrated; head with 2 parietal lobes Palophinae
3. Winged or with wing rudiments; if wingless then the mesonotum is longer than metanotum or at least anal segment of male is not split and bilobed and female without beak-shaped ovipositor Necrosciinae
- Wingless (except *Phantasca* Redtenbacher); mesonotum usually shorter than metanotum 4
4. Male anal segment never split and bilobed Heteronemiinae
- Male anal segment split and bilobed, or at least with 2 finger-shaped, curved medioventral processes Lonchodinae

Subfamily Heteronemiinae

Apterophasmina Gray, 1835:14 (in part).

Bacunculus Burmeister, 1838:566.

Heteronemiinae Günther, 1953:561.

KEY TO THE TRIBES OF HETERONEMIINAE

1. Margins of 9th tergum of male turned downward and overlapping ventrally so that the segment, at least apically, appears as closed tube Heteronemiini
- Margins of 9th tergum of male built normally, not ending in closed apical tube Libethrini

Tribe Heteronemiini

Bacteriinae Kirby, 1904a:348.

Baeunculini Brunner, 1907:303.

Diapheromeriinae Karny, 1923:237.

Heteronemiini Günther, 1953:561.

Genera included: *Calynida* Stål, *Diapheromera* Gray, *Heteronemia* Gray, *Litosermyle* Hebard, *Manomera* Rehn, *Ocnophylla* Brunner, *Oncotophasma* Rehn, *Oreophoetes* Rehn (= *Allophylus* Brunner), *Pseudosermyle* Candell, *Megaphasma* Candell, *Sermyle* Stål (= *Hoplolibethra* Candell), *Trichopeplus* Shelford. Distribution: America.

Heteronemia Gray, 1835:13,19.

Bacunculus Burmeister, 1838:566. Type-species *Heteronemia mexicana* Gray, monotypy. Distribution: U.S., Mexico, Costa Rica, Ecuador, Brazil.

Diapheromera Gray, 1835:13,18.

Type-species *Diapheromera sayi* Gray [*Diapheromera femorata* (Say) Harris], monotypy. Distribution: America.

Diapheromera and *Heteronemia* are closely related and form a group apart from other *Heteronemiini*.

Oncotophasma Rehn, 1904a:59.

Type-species *Bostra martini* Griffini (*Oncotophasma martini* (Griffini) Rehn), by designation of Rehn, 1904a:60. Distribution: Costa Rica, Colombia.

Pseudosermyle Candell, 1903:867.

Type-species *Pseudosermyle banksi* by original designation, not *Pseudosermyle arbuscula* as stated by Kirby. Distribution: U.S.

Tribe Libethrini

Phantasis Saussure, 1870:188.

Libethrini Günther, 1953:561.

Genera included: *Bacteria* Kirby (= *Bacunculus* Brunner), *Bactricia* Kirby, *Libethra* Stål (= *Caulonia* Stål), *Libethroidea* Hebard, *Phantasca* Redtenbaeher, *Pterolibethra* Günther, *Pseudobacteria* Saussure (= *Dyme* Stål). Distribution: Central and South America, Mozambique, South Africa.

Libethra Stål 1875b:20,74.

Bacteria Westwood, 1859:20 (= *Ceroys* Saussure), (= *Caulonia* Stål), Brunner, 1906–1908:304. Type-species *Libethra nisseri* Stål, by designation of Kirby, 1904a. Distribution: Colombia, Ecuador, Brazil.

Subfamily Lonchodinae

Lonchodidae Brunner, 1893:80,81.

Lonchodinae Rehn, 1904a:38; Kirby, 1904a:317; Günther, 1953:548,560.

Lonchodini Brunner, 1906–1908:239.

Prisonerinae Karny, 1923:236.

KEY TO THE TRIBES OF LONCHODINAE

- Anal segment of male split and extended into 2 lobes and with 2 finger-form processes on hind margin; female operculum simple Lonchodini
- Anal segment of male not truly split but merely with 2 weak but distinct finger-form processes on hind margin; super-anal lamina of female often attached to anal segment without suture, anal segment and operculum elongate, latter bearing an ovipositor shaped like bird's beak . . . Menexenini

Tribe Lonchodini

Lonchoda Brunner, 1893:81.

Prisonerinae Karny, 1923:236.

Lonchodini Günther, 1953:560.

Genera included: *Carausius* Stål, *Chondrostethus* Kirby, *Dixippus* Stål (= *Phasgania* Kirby), *Echinothorax* Günther, *Greenia* Kirby, *Lonchodes* Gray (= *Prisoneria* Brunner, not Gray), *Marcenia* Sjöstedt, *Mithrenus* Stål, *Mensilochus* Stål, *Myronides* Stål, *Parastheneboca* Carl, *Pericentropsis* Günther, *Periphetes* Stål, *Phaortes* Stål, *Phenacephorus* Brunner, *Prisoneria* Gray, not Brunner (= *Stheneboca* Stål), *Pseudostheneboca* Carl, *Staelonchodes* Kirby (= *Lonchodes* Brunner, not Gray). Distribution: Orient.

Lonchodes Gray, 1835:13,19.

Type-species *Lonchodes brevipes* Gray, by selection of Kirby, 1904a:321. Distribution: Southeast Asia to Australia.

Dixippus Stål, 1875b:9,66.

Type species *Phasma crawangensa* de Haan [*Dixippus crawangensa* (de Haan) Stål], by designation of Rehn 1904a:41 (= *Phasgania* Kirby, 1896:461), type-species *Phasgania everetti* Kirby, 1896:461, by designation of Kirby, 1904a:324. Kirby placed *Phasma crawangensa* in *Phasgania* along with *Phama everetti*, from which it is evident that *Phasgania* is a junior synonym of *Dixippus*. Distribution: Singapore and East Indies.

Myronides Stål, 1875b:3,63.

Type-species *Lonchodes pfeifferae* Westwood [*Myronides pfeifferae* (Westwood) Stål], by designation of Rehn, 1904a:38. Distribution: India and East Indies.

Carausius Stål, 1975b:8,64.

Type-species *Carausius strumosus* Stål, 1875b:64, by designation of Rehn, 1904a:42. Distribution: Southeast Asia.

Echinothorax Günther, 1932a:757.

Type-species *Echinothorax gazellae* (Brunner, 1907) Günther. Distribution: Bismarck, Archipelago.

Tribe Menexenini

Menexi Brunner, 1893:81.

Neopromachini Günther, 1953:560.

Menexenini, revised spelling.

Brunner (1893) established a tribe which he termed *Menexi*, based on the genus *Menexenus*. To him this was both a nominal taxon and a valid taxonomic group. Günther (1953) accepted it as a valid taxonomic tribe but had no right to replace the nominal genus that Brunner had selected with another one of his own choice, *Neopromachus*.

Genera included: *Brachyrtacus* Sharp, *Eupromachus* Brunner, *Hyrtacus* Stål, *Manduria* Stål, *Menexenus* Stål, *Mortites* Günther, *Neopromachus* Giglio-Tos (= *Promachus* Stål). Distribution: Philippines, New Guinea, Australia.

Menexenus Stål, 1875b:73.

Menexus Brunner, 1893:81, a misspelling. Type-species *Acanthoderus lacertinus* Westwood [*Menexenus lacertinus* (Westwood) Stål], monotypy. Distribution: Southeast Asia.

Subfamily Necrosciinae

Necrosidae Brunner, 1893:80,83.

Candaiae Brunner, 1893:83.

Necroscinae Rehn, 1904a:71.

Necrosciini Redtenbacher, In Brunner v. Wattenwyl and Redtenbacher, 1906–1908:470.

Genera included: *Acacus* Brunner, *Anarchodes* Redtenbacher, *Anascles* Redtenbacher, *Andropromachus* Carl, *Apora* Brunner, *Armanoidea* Redtenbacher, *Asceles* Redtenbacher, *Aschiphasmodes* Karny, *Asyatata* Redtenbacher, *Battacus* Werner, *Calvisia* Stål, *Candaules* Stål, *Centema* Redtenbacher, *Centrophasma* Redtenbacher, *Cercophylla* Redtenbacher, *Chersacae* Redtenbacher, *Cylindomena* Günther, *Diagelus* Brunner, *Diacanthoidea* Redtenbacher, *Diardia* Redtenbacher, *Diesbachia* Redtenbacher, *Dilophocephalus* Toledo Piza, *Echinoclonia* Carl, *Eubias* Günther, *Eurnecrosia* Dohrn, *Galactea* Redtenbacher, *Gargantuoides* Redtenbacher, *Hemiplasta* Redtenbacher, *Hemisosibia* Redtenbacher, *Lamachodes* Redtenbacher, *Lamachus* Stål, *Leprocaulinus* Uvarov (= *Leprocaulus* Redtenbacher), *Lopaphus* Westwood, not Redtenbacher, *Loxopsis* Westwood, *Malandella* Söstedt, *Marmessoides* Brunner, *Meionecroscia* Redtenbacher, *Mesaner* Redtenbacher, *Micadina* Redtenbacher, *Necroscia* Audinet-Serville, not Redtenbacher, *Necrosciodes* Karny, *Neoclides* Uvarov (= *Neocles* Stål), *Nescicroa* Karny (= *Necroscia* Redtenbacher, not Audinet-Serville), *Orthonecroscia* Kirby (= *Ocellata* Redtenbacher), *Orxines* Stål (= *Lopaphodes* Karny), *Otraleus* Günther, *Oxyartes* Stål, *Pachyscia* Redtenbacher, *Paracentema* Redtenbacher, *Paradiacantha* Redtenbacher, *Paraloxopsis* Günther, *Paramenexenus* Redtenbacher, *Paramyronides* Redtenbacher, *Paranecroscia* Redtenbacher, *Parasipyloidea* Redtenbacher, *Parasosibia* Redtenbacher, *Parasthenoboea* Redtenbacher, *Paroxyartes* Carl, *Proscelis* Uvarov (= *Perisceles* Redtenbacher), *Phaenopharos* Kirby, *Phenacocephalus* Werner, *Platy-*

sosibia Redtenbacher, *Pomposa* Redtenbacher, *Pseudodiacantha* Redtenbacher, *Rhamphosipyloidea* Redtenbacher, *Scioneura* Karny, *Sinophasma* Günther, *Sipyloidea* Brunner, *Sosibia* Stål, *Syringodes* Redtenbacher, *Tagesoidea* Redtenbacher, *Thrasyllus* Stål, *Trachytorax* Redtenbacher, *Trigonophasma* Kirby. Distribution: Southeast Asia, to Australia and Solomon Islands.

Necroscia Audinet-Serville, 1839:250, not Redtenbacher, 1906–1908:557.

= *Necroscia* Karny, 1923:242. Type-species *Necroscia terminalis* Redtenbacher, by designation of Karny. Type-species *Necroscia roseipennis* Audinet-Serville, 1839:252, by designation of Kirby, 1904a:374. Distribution: Southeast Asia and Africa.

Aruanoidae Brunner, 1893:84.

Type-species *Necroscia marmessus* Westwood [*Marmessoidea marmessus* (Westwood) Brunner], by indication of Brunner, 1893 and acceptance by Rehn, 1904a:73. Kirby incorrectly designated *Mantis rosea* F. to be the type-species of Marmessoidea. Distribution: Southeast Asia.

Sosibia Stål, 1875b:42,87.

Type-species *Sosibia nigrispina* Stål, by designation of Rehn, 1904a:71. Distribution: Southeast Asia.

Sipyloidea Brunner, 1893:84,86.

Type-species *Necroscia sipylyus* Westwood [*Sipyloidea sipylyus* (Westwood) Brunner], by indication of Brunner, 1893, and acceptance by Rehn, 1904a:76. Distribution: Southeast Asia.

Calvisia Stål, 1875b:42,87.

Type-species *Necroscia sangarius* Westwood [*Calvisia sangarius* (Westwood) Stål], by designation of Rehn, 1904a:71. Distribution: Southeast Asia.

Oroxines Stål, 1875b:43,87.

Type-species *Anophlepis xiphias* Westwood [*Oroxines xiphias* (Westwood) Stål], by designation of Rehn, 1904a:71, not *Phasma macklottii* Haan, as stated by Kirby, 1904a:367. Distribution: Southeast Asia.

Subfamily Pachymorphinac

Pachymorphae Brunner, 1893:89.

Clitumnini Brunner, *In* Brunner v. Wattenwyl and Redtenbacher 1906–1908:181, invalid.

Pachymorphinac Karny, 1923:235; Günther, 1943:559; Beier, 1968:7.

KEY TO THE TRIBES OF PACHYMPHINAE

We are unable to present a proper key to these tribes but the following notes and the paragraph translated from Günther may be helpful.

— Anal segment in male truncate or slightly emarginate, that of female variable; antennae shorter than anterior femora; 2nd abdominal segment

- 2× longer than wide; cerci sometimes elongate but never with dilated lobes; middle and posterior femora unarmed or rarely spinulose *Ramulini*
- Differing from preceding in having antennae as long as anterior femora or longer, and cerci foliate-rounded; anterior femora dentate beneath *Pachymorphini*
- African and Malagasy species that Brunner incorrectly placed in *Pachymorpha* Gray (i.e. *Pachymorpha madagassa* Brunner, *P. distincta* Brunner, *P. omphala* Westwood, *P. tricarinata* Brunner, *P. sansibarica* Brunner, *P. congensis* Brunner) and possibly a species in Celebes and 2 in New Guinea *Hemipachymorphini*

Paragraph translated from Günther, 1953: "As Pachymorphinae I include the apterous species with short antennae that come mostly from East Africa which Brunner grouped around *Ramulus* Saussure (= *Gratidia* Stål), for the most part properly; these form the tribe Ramulini which Brunner included as part of his tribe Clitumnini. The many species of *Ramulus* occur in Africa, south of Sahara, and a few species in Madagascar, Persia, Central Asia, India and Java. The closely related *Leptinia* Pantel has a few species in southern Europe besides those in Africa. Here also belong the partly highly-specialized genera *Phthoa* Karsch, *Zehntneria* Brunner, from South Africa, and *Burria* Brunner from Somaliland, as well as *Macella* Stål and *Gongylopus* Brunner from China and Cochin. *Parapachymorpha* Brunner, with three species from Burma and New Guinea, belongs in or near the genus *Dimorphodes* Westwood in the subfamily Xero-derinae, q.v. I place the genus *Pachymorpha* sense of Kirby, not Gray, in tribe two, Hemipachymorphini. That genus contains the African and Malagasy species which Brunner, incorrectly, placed in *Pachymorpha* Gray. Its relationship with the Ramulini (here called Clitumnini) is doubtful; the true relationships for the following genera, also placed in this tribe, are wholly obscure; *Dagys* Günther, *Pachymorpha epidicus* Günther (1935) from Celebes; *Pseudopromachus* Günther (1929) and *Oreophasma* Günther (1929) both from New Guinea. Finally, I place here as the third tribe Pachymorphini, the Australian and New Zealand genera *Pachymorpha* Gray, *Mimarchus* Carl, *Micrarchus* Carl, and the wholly questionable *Acanthoderus* Gray, not Brunner nor Karny. The Pachymorphinae probably do not form a natural group in this arrangement."

Tribe Pachymorphini

Pachymorpha Brunner, 1893:89.

Pachymorphini Günther, 1953:559.

Genera included: *Acanthoderus* Gray (not Brunner, nor Karny) *Micrarchus* Carl, *Mimarchus* Carl, *Pachymorpha* Gray (not Brunner). Distribution: Africa, South Europe, Madagascar, Asia, Australia, New Guinea, New Zealand.

Pachymorpha Gray, 1835:13,21.

Type-species *Pachymorpha squalida* Gray, 1835:21, by monotypy. Gray designated *Bacillus squalidus* Gray, 1833:18, as a synonym of *P. squalida* Gray 1835; but, since he designated the latter as a new species, the synonymy technically became subjective. Distribution: Australia, Papua, New Zealand.

Tribe Hemipachymorphini

Hemipachymorphini Günther, 1953:559.

Taxa included: *Dagys* Günther, *Hemipachymorpha* Kirby, *Oreophasma* Günther, *Pseudopromachus* Günther, *Tectarchus* Salmon. Distribution: Africa, Madagascar, Papua Celebes.

Hemipachymorpha Kirby, 1904a:341.

Type-species *Pachymorpha omphale* Westwood [*Hemipachymorpha omphale* (Westwood) Kirby], by designation of Kirby, 1904a:341. Distribution: South Africa.

Tribe Ramulini

Clitumnidae Brunner, 1893:87.

Clitumninae Caudell, 1903:865.

Ramulini Günther, 1953:559.

Genera included: *Burria* Brunner, *Cerasticus* Caudell, *Gongylopus* Brunner, *Leptynia* Pantel, *Leptyniella* Bolivar, *Macellina* Uvarov (= *Macella* Stål), *Parabacillus* Caudell, *Paraleptynia* Caudell, *Parapachymorpha* Brunner, *Phthoa* Karsch, *Ramulus* Saussure (= *Gratidia* Stål), *Steleoxiphus* Rehn, *Wattenicylia* Toledo Piza, *Xiphophasma* Rehn, *Zehntneria* Brunner. Distribution: Africa, Madagascar, Southern Europe, Central Asia, China.

Parapachymorpha Brunner, 1893:95.

Type-species *Parapachymorpha nigra* Brunner, by designation of Kirby, 1904a: 342. Distribution: Burma, Philippines.

Macellina Uvarov, 1940:112.

Type-species *Bacillus souchongia* Westwood [*Macella souchongia* (Westwood) Stål], by designation of Rehn, 1904a:80; *Macella* an occupied name. Distribution: Southeast Asia.

Subfamily Palophine

Palophinac Kirby, 1896:465; Beier, 1968:7.

Palophi Redtenbacher, 1908:391.

Genera included: *Bactrododema* Stål, not Redtenbacher, *Dematobactron* Karny (= *Bactrododema* Redtenbacher, not Stål), *Ischnophasma* Uvarov (= *Ischnopoda* Granddidier), *Palophus* Westwood. Distribution: Africa.

Bactrododema Stål, 1859a:308.

Type-species *Bactrododema tiarata* Stål, by designation of Rehn, 1904a:70.
Distribution: Africa.

KEY TO THE SUBFAMILIES OF PHASMATIDAE

1. Anterior femora rarely triangular in cross section, but if they are, then neither serrate nor dentate at base (Exception: apterous Cladoxerini); anterior femora usually with four distinct carina, and if so not serrate at base nor on upper carina 2
- Anterior femora approximately triangular in cross section, serrate at least dorsobasally; either with wing rudiments or with mesonotum longer than metanotum; some small, apterous species in Burma and Indonesia with dorsobasally smooth fore femora, a short mesonotum, and a hal segment of male cleft Phasmatinae
2. Female operculum sometimes extends for some distance over apex of abdomen. America, Madagascar Cladomorphinae
- Female operculum simple, Old World forms, mainly Indo-Australian 3
3. Operculum of female and elongate supra-anal lamina form beak-shaped ovipositor, often attached without suture; posterior femora of male often thickened and armed. Melanesia to Fiji Eurycaanthinae
- Female operculum and supra-anal lamina do not form a beak-shaped ovipositor; hind femora of male never thickened or armed 4
4. Ventrolateral carinae of middle and hind femora finely serrate or smooth; anterior femora not compressed at base 5
- Femora with blunt teeth or lobes on carinae; anterior femora distinctly compressed. Melanesia, Celebes, New Guinea, Australia Xeroderinae
5. Cheeks not broader than eye; wings usually well developed, elytra elongate oval, weakly umbonate. Australia, New Guinea, Madagascar Tropidoderinae
- Cheeks broader than eye; elytra and often wings short or wanting. New Guinea, Philippines, Moluccas, Greater Sunda Islands Platyeraninae

Subfamily Cladomorphinae

Bacteridae Brunner, 1893:83.

Cladomorphidae Brunner, 1893:90,98.

Bacterinae Rehn, 1904a:61.

Bacteriinae Kirby, 1904a:348.

Phibalosomini Redtenbacher, In Brunner v. Wattenwyl and Redtenbacher, 1906-1908:339.

Phibalosominae Chopard, 1912:343; Günther, 1953:557.

Phibalosomidae Brünnner, 1915:233.

Diapheromerinae Karny, 1923:237.

Cladoxerinae Karny, 1923:237.

Phibalosomatinae Moxey, 1971:67.

Cladomorphinae NEW STATUS for Cladomorphidae Brunner.

KEY TO THE TRIBES OF CLADOMORPHINAE

- | | |
|--|-------------------|
| 1. Antennae of female longer than anterior femur | 2 |
| — Antennae of female much shorter than anterior femur | Cladoxerini |
| 2. Inferior median carina of anterior femora midway between anterior and posterior carinae | 3 |
| — Inferior median carina of anterior femora approaching anterior inferior carina; females without rudiments of wings | Cladomorphini |
| 3. Both sexes with rudiments of wings. Central America and Antilles | Hesperophasmatini |
| — Females without rudiments of wings; males unknown. Tropical South America | Craspedoniini |

Tribe Craspedoniini

Cranidiini Günther, 1953:557.

Craspedoniini nomen n.

Genus *Craspedonia* Westwood, 1843:25.

Craspedonia Westwood, 1843:25.

Cranidium Westwood, 1843:49, described as subgenus of *Diapherodes* Gray. *Phasmilliger* Carrera, 1960:100. Type-species of *Craspedonia*: *Phasma (Craspedonia) gibbosa* Burmeister [*Craspedonia gibbosa* (Burmeister) Westwood], by monotypy. Type-species of *Cranidium*: *Diapherodes (Cranidium) serricolis* Westwood [*Craspedonia gibbosa* (Burmeister) Westwood], by present designation. Type-species of *Phasmilliger*: *Phasmilliger (Diapherodes) gibbosus* (Burmeister) Carrera.

Westwood synonymized the type-species of his new subgenus *Craspedonia* (1842) with *Diapherodes gibbosa* Burmeister (1838) and as he gave no authority for the species that he called *Phasma (Craspedonia) gibbosa*, the synonymy is not only correct but may be regarded as objective. The type-species is therefore *Diapherodes gibbosa* Burmeister, and not *Diapherodes (Craspedonia) undulata* Westwood, as stated by Kirby, 1940a:387.

In the early years of the nineteenth century, Illiger, the curator of insects in the Humboldt Museum in Berlin, intended to describe two specimens of a species of stick insect from Brazil under the name *Cranidium* but never published his work. Burmeister (1838, 2: 574), in discussing the genus *Diapherodes*, noted that Illiger had used the name *Cranidium* in manuscript for a part of *Diapherodes* but he did not accept that name. His having mentioned this manuscript name gave it no status, nor did it make it unavailable for future work. Westwood was within his rights when he established *Cranidium* as a subgenus of *Diapherodes*. Carrera mistakenly thought that Burmeister (1838) invalidated the name *Cranidium* by using it and erected a new genus for *gibbosa*, namely, *Phasmilliger*. Redtenbacher (1906–1908:435) accepted the genus *Cranidium* but incorrectly at-

tributed it to Burmeister; he included only one species which he called *Cranidium gibbosa* Burmeister.

Distribution: Brazil, Venezuela, French Guiana.

Tribe Hesperophasmatini

Phantases Brunner, 1893:82 (in part) a vernacular plural name derived from the preoccupied name *Phautasis*.

Bacteriae Brunner, 1893:83 (in part).

Haplopodini Günther, 1953:557.

Hesperophasmatini Rehn, 1901:271.

Brunner made *Phantasis* Saussure the type-genus of a family group, but *Phantasis* was preoccupied, and Rehn replaced it with the nominal genus *Hesperophasma* Rehn, which must therefore be the type-genus of the tribe which Günther called "*Haplopodini*"; although Rehn initially placed it in *Heteronemiinae*.

Genera included: *Agamemnon* Moxey, *Aploploides* Rehn and Hebard, *Aplopus* Gray, *Bostra* Stål, *Clonistria* Stål, *Diapherodes* Gray, not Kaup, *Hesperophasma* Rehn (*Phantasis* Saussure preoccupied) *Lamponius* Stål (= *Antillophilus* Carl, *Pterinoxylus* Audinet-Serville, *Taraxippus* Moxey, *Tersomia* Kirby).

Rehn and Hebard (1938) indicate the taxonomic difficulties in this area. At present *Clonistria* is separated from *Bostra* only by having the metatarsus sulcate in the former and carinate in the latter. The type-species of *Clonistria*, Stål's *bartholomea*, is further separated from the type-species of *Bostra*, Westwood's *Bacteria turgida*, by having the mesonotum equal in length to the metanotum while *Bostra* has the mesonotum half as long as the metanotum. Unfortunately, in males, it is often difficult to decide whether the metatarsus is sulcate or carinate; this grades from one to the other through different species.

Hesperophasma Rehn, 1901:271.

Phantasis Saussure, 1870:188, preoccupied by *Phantasis* Thomson. Type-species *Phasma planulum* Westwood [*Hesperophasma planulum* (Westwood) Rehn] by designation of Rehn, 1904a:47, not *Phantasis saussurei* Bolívar as stated by Kirby. Distribution: Cuba, San Domingo.

Aplopus Gray, 1835:34.

Haplopus Burmeister, 1838:576; Kirby, 1904a:363; Redtenbacher, 1906-1908:429. Type-species *Aplopus micropterus* Gray (with which Gray subjectively synonymized *Phasma angulata* Stoll and *Cyphocraena microptera* Latreille, Lepeletier de Saint-Fargeau, Audinet-Serville and Guérin) by monotypy, not *Mantis jamaicensis* Drury as stated by Kirby, which was not an originally included species. Rehn and Hebard (1938:52) suggested that the strong struc-

tural features in certain species of *Aplopus* and *Diapherodes* may indicate generic units that have not yet been discovered. Distribution: Central America and Caribbean Islands.

Postra Stål, 1875a:6,13.

Type-species *Bosra turgida* (Westwood) Stål, by monotypy. Distribution: Central and South America. This genus was placed in *Heteronemiinae* by Rehn (1904a:57) and by Hebard (1919), thus removing it from the *Cladomorphinac* where Redtenbacher had placed it, but Rehn and Hebard (1938) returned it to the 'Phibatosominae'; they noted that it was very close to *Calynda* Stål, differing only in character of the metatarsi.

Clonistria Stål, 1875a:6,13,16.

Type-species *Clonistria bartholomaea* Stål, by monotypy. Rehn and Hebard (1938:41) indicated that this name may prove to be a synonym of *Mantis linearis* Drury. Distribution: West Indies.

Diapherodes Gray 1835:13,33.

Type-species *Diapherodes gigas* Drury. Distribution: Antilles. Gray (1835) used Drury's (1773) *Mantis gigas*. Although this name was then preoccupied by *Gryllus (Mantis) gigas* Linné (1788), by placing it in a new genus (i.e., *Diapherodes*) it was no longer a junior homonym and could thus be resurrected, and, being the oldest name, has priority.

Tribe Cladoxerini

Cladoxerinae Karny, 1923:237.

Cladoxerini Günther, 1953:557.

Genera included: *Cladoxerus* Latreille, Lepeletier de Saint-Fargeau, Audinet-Serville, Guérin, *Parabactridium* Redtenbacher. Distribution: South America and Madagascar.

Cladoxerus Latreille, Lepeletier de Saint-Fargeau, Audinet-Serville, Guérin, 1825: 445.

Bactridium Redtenbacher, 1906–1908:400, not Saussure, 1868:66. Type-species of *Cladoxerus*: *Cladoxerus gracilis* Latreille, Lepeletier de Saint-Fargeau, Audinet-Serville, and Guérin, by monotypy. Type-species of *Bactridium*: *Bactridium coulonianum* Saussure, by monotypy. Distribution: Brazil and British Guiana.

Redtenbacher (1906–1908:400) synonymized *Cladoxerus* with *Bactridium* by placing its type-species *Cladoxerus gracilis* in *Bactridium* but failed to adopt *Cladoxerus* (1825) instead of *Bactridium* (1868). Karny (1923:237) adopted the same *Cladoxerus*, supposing *gracilis* to be the type-species.

Tribe Cladomorphini

Bacteriac Brummer, 1893:83.

Cladomorphi Brunner, 1893:98.

Phibatosomini Günther, 1953:557.

Phibalosomatinae Moxey, 1971:67.

Cladomorphini, revised form of tribal name.

Genera included: *Bacteria* Latreille, Lepeletier de Saint-Fargeau, Audinet-Serville, Guérin (= *Phanoctes* Stål), *Cladomorphus* Gray, *Hirtuleius* Stål. Distribution: Brazil and French Guiana.

Cladomorphus Gray, 1835:12, 15.

Phibalosoma Gray, 1835:14, 42. Type-species of *Cladomorphus*: *Phibalosoma lepeleiri* i.e. *lepelletieri* Gray (*Cladomorphus lepelletieri* Gray). Kaup (1871) said that there are 2 groups of *Phibalosoma*, 1 in which the 1st segments of the tarsi are only as long as the 2 following segments, the other with the 1st segments of the tarsi as long as the remaining segments taken together. To the 1st group he assigned *ceratocephalus*, by which he meant *Cladomorphus ceratocephalus* Gray, and *Phibalosoma lepelletieri* Gray which he designated type. Although he did not mention the name *Cladomorphus* he thus effectively designated *Phibalosoma lepelletieri* as the type of *Cladomorphus*. Type-species of *Phibalosoma*: *Phibalosoma lepelletieri* Gray (*Cladomorphus phyllinus* Gray) by monotypy. Distribution: French Guiana and Brazil.

According to Kirby, *Philbalosoma lepelletieri* Gray is a synonym of *Cladomorphus phyllinus* Gray, but this synonymy is subjective; if correct, and we have no reason to doubt it, then *Cladomorphus* and *Phibalosoma* are synonyms and the act of the first reviser determined which of the two names must endure. Burmeister (1838) was the first reviser; under the genus *Cladoxerus* he referred to *Cladoxerus phyllinus* Gray, but he nowhere mentioned *Phibalosoma*, which therefore is no longer valid despite its considerable usage following Westwood (1859). Brunner (1893:98) adopted the generic name *Cladomorphus*.

Bacteria Latreile, Lepeletier de Saint-Fargeau, Audinet-Serville, Guérin, 1825:446.

Type-species *Mantis ferula* F. (*Bacteria ferula* (F.) Latreile et al.) by designation of Rehn (1904a); but in his discussion it is obvious that he intended the type to be the species figured by Stoll (*baculus* not *ferula*) and thus he was using *ferula* in the sense of Lichtenstein (1802). However Redtenbacher synonymized *Mantis ferula* with *Phasma arunatica* Stoll which Kirby synonymized with *Mantis baculus*. Distribution: West Indies and British, Dutch and French Guiana.

Hirtuleius Stål, 1875b:29.

Type-species *Hirtuleius laeviceps* Stål, by monotypy. Distribution: Brazil, French Guiana.

Subfamily Platyceraninae

Platyceraninae Brunner, 1893:97.

Platyceraniinae Günther, 1953:567.

Genera included: *Acanthograeffea* Günther, *Anophelepis* Westwood, *Brachyrhamphus* Carl, *Echelthus* Stål (= *Ernades* Redtenbacher, not Wallengern), *Elicius* Günther, *Erastus* Redtenbacher, *Graeffea* Brunner, *Megacrania* Kaup, *Ommatopscudes* Günther, *Ophicrania* Kaup (= *Arridaeus* Stål, = *Apterrihidacus* Karny) *Platyterana* Gray, *Xenomaces* Kirby. Distribution: Orient, East Indies, New Guinea, Australia, Moluccas, Philippines, Melanesia.

Platyterana Gray, 1835:36.

Platyterania Westwood, 1859:112.

Type-species *Platyterana viridana* Gray, by designation of Karny, 1923. Distribution: East Indies, Philippines.

Ophicrania Kaup, 1871:38.

Type-species *Ophicrania striatocollis* Kaup, by monotypy (= *Arrhidacus* Stål, 1875b:15. Type-species *Necrosia stygius* i.e. *stygius* Westwood, 1859:136). *Ophicrania stygius* (Westwood) NEW COMBINATION, by designation of Rehn, 1904a:85. Distribution: Philippines, Indonesia.

Graeffea Brunner, 1868:46.

Type-species *Graeffea purpuripennis* Brunner [*Graeffea crouanii* (Le Guillou 1841) Kirby], by monotypy. Distribution: Samoa. Rehn (1904a:85) gave Stål (1875b) as author of *Graeffea* and designated *Lopaphus coccophagus* Westwood, a subjective synonym of *Graeffea crouanii*, as type.

Subfamily Xeroderinae

Xeroderinae Günther, 1953:556.

Genera included: *Cotylosoma* Wood Mason, *Cooktownia* Sjöstedt, *Epicharmus* Stål, *Leostenes* Stål, *Nisyrus* Stål, *Xenophasmina* Uvarov (= *Xenophasma* Redtenbacher), *Xeroderus* Gray. Distribution: Orient, Mauritius, Australia, New Guinea, Melanesia.

Xeroderus Gray, 1835:32.

Type-species *Xeroderus kirbii* Gray, by monotypy. Distribution: Australia.

Subfamily Eurycaanthinae

Eurycaanthae Brunner, 1893:89.

Eurycaanthinae Kirby, 1904a:395.

Genera included: *Acanthodyta* Sharp, *Asprenas* Stål, *Canachus* Stål, *Cnispus* Redtenbacher, *Dryocoelus* Gurney, *Eurycaantha* Boisduval, *Labidiophasma* Carl, *Paracanachus* Carl, *Poecilobactron* Güther, *Thaumatobactron* Günther, *Trapezaspis* Redtenbacher. Distribution: New Guinea, Western Pacific.

Eurycaantha Boisduval, 1835:647.

Karabidion Montrouzier, 1855.

Type-species *Eurycaantha horrida* Boisduval, by monotypy. Distribution: New Guinea, Western Pacific.

Subfamily Phasmatinae

Acrophyllae Brunner, 1893:97.

Acrophyllinae Kirby, 1904a:379.

Phasmatae Karny, 1923:240; Günther, 1953:554.

Phasmatinae, corrected spelling.

KEY TO THE TRIBES OF PHASMATINAE

1. Both sexes, or at least female, apterous	6
— Both sexes alate or with wing rudiments	2
2. Cerci of female short and slender; male without ocelli; elytra or wings of female often strongly reduced	3
— Cerci of female strongly flattened and widened or elongate and lanceolate; ocelli of male distinct	Phasmatini
3. Operculum of female not exceptionally long	5
— Operculum of female extended broadly over apex of abdomen	4
4. Body slender, elongate, unarmored; no elytra	Phasmatenionema
— Body elongate, spinose; elytra elongate-oval	Achriopterini
5. Head swollen; middle and hind femora with tooth-like, serrate inferior carinae. New Guinea	Stephanacridini
— Head flattened; middle and posterior femora at most with few little thorns at apex. Australia	Acanthomimini
6. Both sexes completely lacking organs of flight; median segment distinctly shorter than metanotum, usually much shorter	7
— Male alate; median segment of female almost or completely as long as metanotum	Pharnaciini
7. Ceylon, India, Indonesia	Baculini
— Australia, New Zealand	Acanthoxylini

"Among these tribes many unnatural relationships are probably established or too broadly established; the Pharnaciini and Baculini especially are probably not so close and research on the anal segments of the male will very likely cause other allotment." Günther (1953:555).

Tribe Acanthoxylini

Macracanthini Günther, 1953:555.

Acanthoxylini, by present designation.

Genera included: *Acanthoxyla* Uvarov (= *Macracantha* Kirby), *Argosarchus* Brunner, *Arphax* Stål, *Clitharchus* Stål. Distribution: Australia, New Zealand.

Acanthoxyla Uvarov, 1944. n.n. for *Macracantha* Kirby, not Simon.

Macracantha Kirby, 1904a:340. *Acanthoderus* Brunner, 1906–1908:238. Type-species *Acanthoderus prasinus* Westwood [*Macracantha prasinus* (Westwood) Kirby], by designation of Kirby, 1904a:340. Distribution: New Zealand.

Tribe Baculini

Baculini Günther, 1953:555.

Genera included: *Baculum* Saussure (= *Clitumnus* Stål, = *Cuniculina* Brunner), *Ectentoria* Brunner, *Entoria* Stål, *Erringtonia* Brunner, *Gharianus* Werner, *Medaura* Stål (cf. Carl, 1913; Günther, 1932a), *Metentoria* Brunner, *Nesiophasma* Günther, *Paraclitumnus* Brunner (= *Dureuilia* Brunner), *Phobaeticus* Brunner, *Phryganistria* Stål, *Prosentoria* Brunner, *Rhamphophasma* Brunner, *Woodmasonia* Brunner. Distribution: India, Ceylon, East Indies.

Baculum Saussure, 1870:292.

Clitumnus Stål, 1875b:66. *Entoria* Stål, 1875b:15,72. Type-species of *Baculum*: *Bacillus cuniculus* Westwood [*Baculum cuniculus* (Westwood) Kirby], by designation of Kirby, 1904a:327. Type-species of *Clitumnus*: Stål (1875b:67) referred several species to *Clitumnus* but stated that none of them had been determined with certainty. The first species that Stål mentioned is *Lonchodes nemotodes* Haan, but he included it in the synonymy of *Dixippus crawangensis* on the preceding page. Type-species of *Entoria*: *Entoria denticornis* Stål, 1875b: 72 [*Baculum denticorne* (Stål) Kirby], by designation of Kirby, 1904a. Distribution: Orient.

Tribe Pharnachiini

Pharnaciini Günther, 1953:555.

Genera included: *Cladomimus* Carl, *Diagoras* Stål, *Eucarchanus* Brunner, *Gigantophasma* Sharp, *Hermarchus* Stål, *Lobophasma* Günther, *Nearchus* Redtenbacher, *Pharnacia* Stål, *Phasmatotenionema* Navas (= *Tacniosoma* Bolivar, *Taenionema* Kirby) *Sadyattes* Stål, *Tirachoidea* Brunner. Distribution: Southeast Asia, Philippines, Melanesia, Polynesia, Australia.

Pharnacia Stål, 1877:40.

Type-species *Pharnacia ponderosa* Stål, by designation of Kirby, 1904a:359. Distribution: India, East Indies, Philippines.

Tirachoidea Brunner, 1893:83.

Type-species *Phibalosoma cantori* Westwood [*Tirachoidea cantori* (Westwood) Brunner], by designation of Rehn, 1904a:70. Distribution: Ceylon, Southeast Asia.

Tribe Acanthomimini

Acanthomimini Günther, 1953:555.

Genera included: *Acanthomima* Kirby (= *Ectus* Redtenbacher and probably *Caruacia* Sjöstedt, 1918). Distribution: Australia.

Acanthomima Kirby, 1904a:438.

Type-species *Anophelepis rhipheus* Westwood [*Acanthomima rhipheus* (Westwood) Kirby], by monotypy. Distribution: Australia.

Tribe Achriopterini

Achriopterini Günther, 1953:555.

Genera included: *Achrioptera* Coquerel, *Hovaspectrum* Rehn. Distribution: Madagascar.

Achrioptera Coquerel, 1861:495.

Type-species *Achrioptera fallax* Coquerel, by monotypy. Distribution: Madagascar.

Tribe Stephanacridinii

Stephanacridinii Günther 1953:555.

Genus: *Stephanacris* Redtenbacher. Distribution: New Guinea.

Stephanacris Redtenbacher, 1906–1908:441.

Type-species *Stephanacris brevipes* Redtenbacher, by present designation. Distribution: New Guinea.

Tribe Phasmatini

Phasmata Brunner, 1893:99.

Acrophyllae Brunner, 1893:97.

Acrophyllinae Kirby, 1904a:379 (in part).

Acrophillini Redtenbacher, 1906–1908:436.

Phasmata Karny, 1923:240.

Phasmini Günther, 1953:555.

Phasmatini, corrected spelling.

Genera included: *Acrophylla* Gray, *Anchiale* Stål, *Ctenomorpha* Gray, *Ctenomorphodes* Karny, *Eurycnema* Audinet-Serville (= *Clemacantha* Rainbow), *Onchestus* Stål, *Papuanoides* *Paracyphocrania* Redtenbacher, *Paronchestus* Redtenbacher, *Peloriana* Uvarov (= *Peloria* Redtenbacher), *Phasma* Lichtenstein (= *Cyphocrania* Lepeletier de Saint-Fargeau and Audinet-Serville), *Vetilia* Stål. Distribution: Southeast Asia to New Zealand.

Phasma Lichtenstein, 1796:77.

Type-species *Phasma empusa* Lichtenstein, by designation of Kirby, 1904a: 390. Distribution: Amboina, New Guinea.

Subfamily Tropidoderinae

Tropidoderi Brunner, 1893:97.

Podacanthinae Günther, 1953:553.

Tropidoderinae, revised subfamily name.

KEY TO THE TRIBES OF TROPIDODERINAE

- Wings and elytra more or less evident in each sex; inner carina of under surface of posterior tibiae of male without strong spines *Tropidoderini*
- Female apterous or with rudimentary elytra, male apterous or alate; in latter case inner carina of under surface of posterior tibiae of male spinose *Monandropterini*

Tribe *Monandropterini*

Monandroptera Brunner, 1893:97.

Raphiderini Günther, 1953:553.

Monandropterini, corrected tribal name.

Genera included: *Heterophasma* Redtenbacher, *Monandroptera* Audinet-Serville, *Raphiderus* Audinet-Serville. Distribution: Philippines, Vietnam, East Indies, Algeria(?).

Monandroptera Audinet-Serville, 1839:242.

Type-species *Monandroptera inuncans* Audinet-Serville [*Monandroptera acanthomera* (Burmeister) Kirby], by monotypy.

Westwood (1841–1845, 2:25, pl. 8) figured an insect which he incorrectly identified as “*Phasma (Craspedonia) gibbosa* (Burmeister)”; the error being pointed to him, he changed the identification to “*Diapherodes (Craspedonia) undulata* n.sp.”. In 1860:80, realizing that the insect figured does not belong to *Diapherodes*, he transferred it to the genus *Monandroptera* and indicated that it probably came from Africa. We do not believe that it is a true *Monandroptera*, but rather a species of *Raphiderus* that has been recorded from Algeria.

Tribe *Tropidoderini*

Tropidoderini Brunner, 1893:97.

Podacanthini Günther, 1953:553.

Genera included: *Athertonia* Sjöstedt, *Didymuria* Kirby (= *Diura* Gray), *Kimberleyana* Sjöstedt, *Lysicles* Stål, *Malandania* Sjöstedt, *Podacanthus* Gray, *Tropidoderus* Gray, *Vasilissa* Kirby. Distribution: Australia.

Tropidoderus Gray, 1835:31.

Type-species *Trigonoderus childrenii* Gray, [*Tropidoderus childrenii* (Gray) Gray]. *Trigonoderus* is a preoccupied name. Distribution: Australia.

SUBORDER AREOLATAE

FAMILY TIMEMATIDAE

Timeminae Caudell, 1903:882.

Timemidae Tinkham, 1942:72.

Timematidae, corrected family name.

The name "To timema-atos" is neuter, and the stem on which the family name must be formed is Timemat-.

Genus: *Timema* Scudder. Distribution: U.S.

Timema Scudder, 1895:30, *nomen nudum*.

Timema Scudder, 1903, in Caudell, 1903:883. Type-species *Timema californicum* Scudder, In Caudell, 1903:883, by monotypy.

Scudder (1895:30) intended to establish a genus under the name *Timema*, gave a short description of it, but included no named species. He said that there was a single species which he proposed to describe as *Timema californicum*, but he did not describe it, so the genus as of that date must be regarded as a *nomen nudum*.

FAMILY BACILLIDAE

Bacillidae Brummer, 1893:101.

KEY TO THE SUBFAMILIES OF BACILLIDAE

1. Antennae distinctly longer than anterior femora; alate or apterous.
Neither in Africa nor Mediteranean 2
- Antennae shorter than anterior femora (except *Xylica* Karsch); apterous.
Africa, Madagascar, Mediterranean Bacillinae
2. If alate or with wing rudiments, then apical areas of middle and hind tibiae each with a small spine, if entirely without wing rudiments, then apical areas of middle and hind tibiae without spines but prosternum with 2 rough warts next to each other. Southeast Asia, Philippines, New Guinea, Micronesia, Melanesia, Madagascar Heteropteryginae
- Apterous; apices of middle and hind tibiae unarmed; without double warts on prosternum. South America, Madagascar Pygirhynchinae

Subfamily Bacillinae

Bacillinae Kirby, 1904a:327.

Bacillini Redtenbacher, 1906-1908:20.

KEY TO THE TRIBES OF BACILLINAE

1. Third segment of antennae slender or slightly depressed, never triquetrous 2
- Third segment of antennae triquetrous, elongate Antongiliini
2. Antennae elongate, filiform, basal segment depressed and laminate Xylicini
- Antennae stout, shorter than anterior femora, basal segment not laminate Bacillini

Tribe Bacillini

Bacillini Günther, 1953:552.

Genera included: *Bacillus* Audinet-Serville, *Clonopsis* Pantel, *Epibacillus* Redtenbacher, *Macynia* Stål. Distribution: Mediterranean region and South Africa.

Bacillus Latreille, 1825.

Type-species *Phasma rossia* Latreille [*Bacillus rossia* (Rossi) Latreille], by monotypy. Kirby's statement (1904a:333) that the type is *Bacillus redtenbacheri* Padewieth is clearly a misprint. Distribution: South Europe, North Africa.

TRIBE ANTONGILIINI

Antongiliini Günther, 1953:553.

Genera included: *Autongilia* Redtenbacher, *Cirisia* Redtenbacher, *Leprodes* Redtenbacher, *Onogastris* Redtenbacher, *Phalces* Stål, *Pseudodatames* Redtenbacher. Distribution: Madagascar, Africa.

Autongilia Redtenbacher, 1906–1908:24.

Type-species *Autongilia laciniata* Redtenbacher, by present designation. Distribution: Madagascar.

Tribe Xylicini

Xylicini Günther, 1953:553.

Genera included: *Batycharax* Kirby, *Ocnobius* Redtenbacher, *Xyllica* Karsch.

Xyllica Karsch, 1898:382.

Type-species *Xyllica oedematosa* Karsch, by monotypy. Distribution: Eastern Africa.

Subfamily Pygirhynchinae

Pygirhynchini Redtenbacher, 1906–1908:57.

Pygirhynchinae Günther, 1953:552.

Genera included: *Acanthoclonia* Stål, *Canuleius* Stål, *Ceroys* Audinet-Serville, *Leiophasma* (n.n. for *Orobia* Stål), *Miroceroys* Toledo Piza, *Mirophasma* Redtenbacher, *Pachyphloca* Redtenbacher, *Parorobia* Chopard, *Pygirhynchus* Audinet-Serville, *Setosa* Redtenbacher. Distribution: Central and South America.

Kirby (1904a) separated *Ceroys* widely from *Pygirhynchus*; Redtenbacher (1906–1908:57) placed them as adjoining genera of Pygirhynchini. The genera are closely related and if they are ever synonymized, *Ceroys* has precedence and the subfamily name will have to be changed accordingly.

Pygirhynchus Audinet-Serville, 1839:260.

Type-species *Pygirhynchus subfoliatus* Audinet-Serville, by designation of Kirby, 1904a:408. Distribution: Mexico, Brazil.

Ceroys Audinet-Serville, 1839:262.

Type-species *Cladomorphus perfoliatus* Gray [*Ceroys perfoliatus* (Gray) Rehn], by designation of Rehn, 1904a:48. Distribution: Mexico to Colombia.

Subfamily Heteropteryginae

Rehn and Rehn (1939) dealing only with the Philippine forms, used the subfamily name Obriminae in the sense that we here use Heteropteryginae. It is not clear why they adopted that name which originated with Brunner, 1915, instead of using Heteropteryginae Rehn, 1904a. They stated that the Obriminae consist of a well-differentiated group which seems to be confined to the Indo-Malayan region and that it is composed of two well-differentiated tribes, the Obrimini and the Datamini, the latter being practically limited to the Philippines. We have no reason to believe that they would exclude the Anisacanthini and Heteropterygini, which do not occur in the Philippines, if they were dealing with a broader fauna.

Heteropteryginae Rehn, 1904a:89; Kirby, 1904a:401, Karny, 1923:234; Günther, 1953:546, 551.

Heteropterygini Redtenbacher, 1906–1908:162.

Obriminae Rehn and Rehn, 1939:400.

KEY TO THE TRIBES OF HETEROPTERYGINAE

- | | |
|---|-----------------|
| 1. Apex of tibiae unarmed; supra-anal lamina of female wanting or not separated from 10th abdominal segment | 3 |
| — Apex of tibiae armed with spine (except <i>Heterocopus</i> Redtenbacher and <i>Tisamenes</i> Stål); supra-anal lamina of female obvious and clearly separated from 10th abdominal segment | 2 |
| 2. Reduced elytra and wings distinct and large | Heteropterygini |
| — No wing-rudiments | Obrimini |
| 3. Supra-anal lamina of female not separated from 10th abdominal segment, reduced elytra and wings distinct and large | Anisacanthini |
| — Apical area of tibiae without spines; supra-anal lamina of female wanting, basal antennae segments without teeth (exception <i>Epidares</i> Redtenbacher) | Datamini |

Tribe Datamini

Obrimini Redtenbacher, 1906–1908:38.

Datamini Rehn and Rehn, 1939:405; Günther, 1953:552.

Genera included: *Dares* Stål, *Datames* Stål, *Epidares* Redtenbacher, *Orestes* Redtenbacher, *Planispectrum* Rehn, *Platypasma* Uvarov (= *Platymorpha* Redtenbacher), *Pyloemenes* Stål, *Woodlarkia* Günther. Distribution: Southeast Asia, Moluccas, Okinawa.

Datames Stål, 1875b: 51, 93.

Type-species *Acanthodermis oilcus* Westwood [*Datames oilcus* (Westwood) Stål], by designation of Rehn, 1904a:89. Distribution: Southeast Asia to Okinawa.

Tribe Anisacanthini

Heteroperygini Redtenbacher, 1906–1908:162.

Anisacanthini Günther, 1953:552.

Genera included: *Anisacantha* Redtenbacher, *Parectatosoma* Wood Mason. Distribution: Madagascar.

Anisacantha Redtenbacher, 1906–1908:162; Günther, 1953:55.

Type-species *Auisacantha difformis* Redtenbacher, by present designation. Distribution: Madagascar.

Tribe Obrimini

Obrimini Brunner, 1893:98.

Obriminidae Brunner, 1915:228.

Therameninae Karny, 1923:232.

Obriminimi Rehn and Rehn, 1939:405.

Obrimini Günther, 1953:552.

Genera included: *Arctaon* Rehn, *Brasidas* Rehn and Rehn, *Eubrimus* Rehn and Rehn, *Eubulides* Stål, *Heterocopus* Redtenbacher, *Hoploclonia* Stål, *Ilocano* Rehn and Rehn, *Mearnsiana* Rehn and Rehn, *Obrimus* Stål, *Pterobrimus* Redtenbacher, *Stenobrimus* Redtenbacher, *Theramenes* Stål, *Tisamenes* Stål. Distribution: Borneo, New Guinea, Philippines, Fiji.

Obrimus Stål, 1875b:49,92.

Type-species *Acanthoderus bufo* Westwood (*Obrimus bufo* Westwood), by designation of Kirby, 1904a:398. Distribution: Philippines.

Theramenes Stål 1875b:46.

Type-species *Euryantha olivacea* Westwood [*Theramenes olivaccus* (Westwood) Rehn and Rehn], by monotypy. Distribution: Philippines.

Tribe Heteropterygini

Heteropteryginae Kirby, 1896:472.

Heteropterygini Günther, 1953:551.

Genera included: *Haaniella* Kirby (= *Heteropteryx* de Haan, not Gray), *Heteropteryx* Gray (= *Leocrates* Stål), *Miroceramia* Günther. Distribution: Borneo, Sumatra, Java.

Heteropteryx Gray, 1835:13,32; Günther, 1953:551.

Leocrates Stål, 1875b:48.

Type-species of *Heteropteryx*: *Phasma dilatata* Parkinson (*Heteropteryx dilatata* Gray), by monotypy. Type-species of *Leocrates*: *Cyphocrania graciosa* Westwood [*Heteropteryx dilatatum* (Parkinson)]. Distribution: Southeast Asia to Java.

FAMILY PSEUDOPHASMATIDAE

Phasmidae of early authors, Brunner, 1893:80; Essig 1942:118,120.
 Pseudophasminae Rehn, 1904a:91; Kirby, 1904a:408; Günther, 1953:545.
 Phasmata Redtenbacher, 1906-1908:117.
 Pseudophasmatidae, corrected spelling.

KEY TO THE SUBFAMILIES OF PSEUDOPHASMATIDAE

1. Claws finely pectinate; elytra, if present, filiform or awl-shaped. Orient *Aschiphasmatinae*
- Claws not finely pectinate 2
2. Femora indistinctly 4-carinate, without inferior median carina and unarmed; anterior femora not compressed at base; ocelli wanting; antennae fine, as long as body, indistinctly segmented. Borneo *Korinninae*
- If femora as described above, then ocelli are present or insects are apterous; otherwise femora with distinctly marked or toothed middle carina, or anterior femora strongly compressed, especially at base; with or without flight organs. America, Madagascar, 1 genus from Borneo *Pseudophasmatinae*

Subfamily Aschiphasmatinae

Aschipasmidae Brunner, 1893:100.
Aschiphasminae Kirby, 1896:475.
Aschipasminae Kirby, 1904a:418.
Ascepasmini Redtenbacher, 1906-1908:73.
Aschiphasmatinae, corrected spelling.

Genera included: *Abrosoma* Redtenbacher, *Aschiphasma* Westwood, *Dinophasma* Uvarov (= *Dina* Redtenbacher), *Orthomeria* Kirby, *Parabrosoma* Giglio-Tos, *Presbistus* Kirby (= *Aschipasma* Brunner, not Westwood). Distribution: India, Southeast Asia to Java.

Aschiphasma Westwood, 1830:442.

Ascepasma Burmeister, 1838:583, Burmeister explained the correct pronunciation of the name of this group but did not establish *Ascepasma* as a nominal genus. *Ascepasma* de Haan, 1842-1844:113. *Aschipasma* Westwood, 1859:92. Type-species. *Aschipasma annulipes* Westwood, by monotypy. Distribution: Southeast Asia to Philippines.

Subfamily Korinninae

Korinninae Günther, 1953:550.

Genera included: *Kalocorinnis* Günther, *Korinnis* Günther. Distribution: Borneo.

Korinnis Günther, 1932b:66.

Type-species *Korinnis potameis* Günther, by monotypy. Distribution: Borneo.

Subfamily Pseudophasmatinae

Pseudophasminae Kirby, 1896:473, 1904a:408.

Pseudophasmatinae, corrected spelling.

KEY TO THE TRIBES OF PSEUDOPHASMATINAE

1. Abdominal segments of male quadrate; of female transverse; legs unarmed; femora neither compressed nor foliaceously dilated; apterous (except *Decidia*) *Anisomorphini*
- Abdominal segments more elongate than in Anisomorphini, quadrate in female, longer than wide in male, or anterior femora compressed or foliaceously dilated 2
2. Middle and posterior femora with median inferior carina absent or obtuse, unarmed 5
- Middle and posterior femora with distinct inferior carina, unarmed or bluntly armed and spinulose 3
3. Elytra and wings usually obvious; posterior and middle femora occasionally with distinct superior carina; subgenital plate of male not hood like; operculum of female not produced 4
- Elytra and wings wanting; femora triangular in cross section, with 3 flat sides; subgenital plate of male hood like; operculum of female strongly produced, elongate *Bacunculini*
4. Elytra short, rotund-ovate; anterior femora not or slightly compressed; ocelli present *Pseudophasmatini*
- Elytra longer, lanceolate, rarely short; anterior femora distinctly compressed, especially toward base; ocelli variable *Xerosomatini*
5. Femora cylindrical or nearly so, or slightly carinate; ocelli present *Stratocleini*
- Anterior femora occasionally obliquely compressed, acutely and distinctly carinate; ocelli wanting *Prisopini*

Tribe Bacunculini

Bacunculinae Kirby, 1896:464.

Donusae Redtenbacher, 1906–1908:98.

Bacunculini Günther, 1953:550.

Genus: *Bacunculus* Burmeister (= *Donusa* Stål). Distribution: Chile, Argentina.

Bacunculus Burmeister, 1838:566.

Donusa Stål, 1875a:7,16,18. Type-species of *Bacunculus* is *Bacteria spatulata* Burmeister [*Bacunculus spatulata* (Burmeister) Bolívar], by present selection. Kirby stated that *Prisomera phyllopus* Gray is the type-species of *Bacunculus* Burmeister. Burmeister did not include *phyllopus* but did include *Bacteria spatulata* Burmeister with which he synonymized *phyllopus* Gray with a query. Type-species of *Donusa*: *Donusa prolixa* Stål, by monotypy. Distribution: Chile.

Tribe Prisopodini^a

Prisopi Brunner, 1893:100.

Prisopinae Kirby, 1904a:403.

Prisopini Günther, 1953:550.

Genera included: *Dajaca* Brunner, *Damasippoides* Brancsik, *Damasippus* Stål, *Dinelytron* Gray, *Paraprisopus* Redtenbacher (= *Melophasma* Redtenbacher), *Periphloea* Redtenbacher, *Phaeophasma* Redtenbacher, *Prisopus* Latreille, *Pseudoleosthenes* Redtenbacher, *Xerantherix* Brancsik. Distribution: Central and South America.

Prisopus Latreille, Lepeletier de Saint-Fargeau, Audinet-Serville, Guérin, 1825: 444.

Type-species *Mantis sacrata* Olivier [*Prisopus sacrata* (Olivier) Kirby], by designation of Kirby, 1904a:405. Distribution: Central and South America.

Tribe Xerosomatini

Xerosomata Brunner, 1893:99.

Sectio Prexaspes Redtenbacher, 1906–1908:127, not a tribal name.

Prexaspes Günther, 1953:550.

Xerosomatini, tribal form of name.

Genera included: *Acanthometriotes* Hebard, *Crooxylus* Audinet-Serville, *Harpana* Redtenbacher, *Isagoras* Stål, *Metriophasma* Uvarov (= *Metriotes* Westwood), *Olinta* Redtenbacher, *Planudes* Stål, *Perliodes* Redtenbacher, *Prexaspes* Stål, *Xera* Redtenbacher, *Xeropsis* Redtenbacher, *Xerosoma* Audinet-Serville. Distribution: Tropical South America.

Xerosoma Audinet-Serville, 1831:61.

Type-species *Xerosoma canaliculatum* Audinet-Serville, by monotypy. Distribution: Costa Rica, Brazil.

Planudes Stål, 1875b:59,98.

Type-species *Planudes perillus* Stål by designation of Rehn, 1904a:99. Distribution: Costa Rica, Colombia, Venezuela, Brazil.

Crooxylus Audinet-Serville 1839:265.

Type-species *Crooxylus corniger* Audinet-Serville, by monotypy. Distribution: Costa Rica, Cuba, Trinidad, Colombia, British Guiana.

Metriophasma Uvarov, 1940:112.

Type-species *Metriotes diocles* Westwood, by designation of Rehn, 1904a:105. *Metriotes* an occupied name. Distribution: French Guiana, Brazil, Colombia, Ecuador, Surinam.

^a Audinet-Serville gave the derivation of *Prisopus* as "prizō, je scie, nous pied." Therefore, on grammatical principles, the family-group names based upon *Prisopus* should be formed with the stem *prisopod-*, giving *Prisopodini*, etc.—Ed. note (G. C. Steyskal).

Tribe Pseudophasmatini

Phasmata Brunner, 1893:99.

Pseudophasmini Günther, 1953:550.

Pseudophasmatini, corrected spelling.

Genera included: *Ignacia* Rehn, *Pseudophasma* Kirby. Distribution: Cuba, South America.

Pseudophasma Kirby, 1896:473.

Type-species *Gryllus necydalooides* L. = *Gryllus phthisicus* L. [*Pseudophasma phthisicum* (L.) Kirby, = *Gryllus brachypterus* Linné, *Phasma bioculatum* Stoll,

Phasma castaneum Bates.], by monotypy. (For priority of *Pseudophasma* Bolívar vs. *Pseudophasma* Kirby, see Rehn, 1904:95, footnote.) Distribution: Cuba, South America.

Ignacia Rehn, 1904a:95.

= *Pseudophasma* Bolívar var. not Kirby, = *Pseudophasma* Bolívar, 1896:12.

Type-species *Pseudophasma auriculatum* Bolívar, by monotypy. Distribution: Amazon basin.

Tribe Stratocleini

Section *Stratocles* Redtenbacher, 1906–1908:100, not a tribal name.

Stratoclinae Brunner, 1915:202.

Stratocleini Günther, 1953:550.

Genera included: *Agrostia* Redtenbacher, *Anisa* Redtenbacher, *Autherice* Redtenbacher, *Brachyelena* Hebard, *Brizoides* Redtenbacher, *Chlorophasma* Redtenbacher, *Citrina* Redtenbacher, *Holca* Redtenbacher, *Holcoides* Hebard, *Olcypoides* Griffini, *Paraphasma* Redtenbacher, *Parastratocles* Redtenbacher, *Tenerella* Redtenbacher, *Stratocles* Stål. Distribution: Amazon basin.

Stratocles Stål, 1875b:57,96.

Type-species *Stratocles cinctipes* Stål, by monotypy. Distribution: Central and South America.

Tribe Anisomorphini

Anisomorpha Brunner, 1893:98.

Anisomorphini Redtenbacher (in part), 1906–1908:87.

Genera included: *Agathemera* Stål, *Anisomorpha* Gray (= *Malacomorpha* Rehn, *Alloeophasma* Redtenbacher), *Antolyca* Stål, *Decidia* Stål, *Paranisomorpha* Redtenbacher, *Pseudolcyphides* Karny (= *Olcypoides* Redtenbacher, not Griffini). Distribution: U.S. to Chile.

Anisomorpha Gray, 1835:13,18.

Malacomorpha Rehn, 1906:13. *Alloeophasma* Redtenbacher, 1908:126. Type-species *Phasma buprestoides* Stoll [*Anisomorpha buprestoides* (Stoll) Gray]. Distribution: America.

FAMILY PHYLLIIDAE

Phyllidae Brunner, 1893:101.

Phyllinae Rehn, 1904:105.

Phyllinae Kirby, 1904a:420.

Genera included: *Chitoniscus* Stål, *Nanophyllum* Redtenbacher, *Phyllum* Illiger. Distribution: Southeast Asia to New Guinea, Seychelles and Solomon Islands.

Phyllium Illiger, 1798:499.

Type-species *Gryllus siccifolius* L. [*Phyllum siccifolium* (F.) Illiger], by designation of Rehn, 1904a:105). Distribution: Southeast Asia to New Guinea to the Seychelles.

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REFERENCES

- Audinet-Serville,⁴ J. G. 1831. Quatrième famille. Spectres, Spectra. Revue Méthodique des insectes de l'ordre des Orthoptères. Ann. Sci. Nat. Zool. Biol. Anim. 22:28-65, 134-162, 262-292.
- . 1839. Histoire naturelle des insectes Orthoptères. Suites à Buffon. Librairie Encyclopédique de Roret, Paris. 18:1-778.
- Beier, M. 1957. Ordnung Cheloptera Crampton 1915. Brom's Kl. Ordn. Tierreichs. (5) (3) 6:305-454.
- . 1968. Phasmida (Stab-order Gespenstheuschrecken) In Kukenthal's Handbuch der Zoologie. 1-56.
- Boisduval, J. B. A. 1835. Faune entomologique de l'océan Pacifique, Voyage de l'Astrolabe. 2:267-716.
- Bolivar, J. 1896. Orthoptera amazonica. Act. Soc. Espan. 25:11-18.
- Brunner, L. 1915. Preliminary catalogue of the orthopteroid insects of the Philippine Islands. Univ. Nebr. Stud. 15:195-281.
- Brunner v. Wattenwyl, K. 1868. Reisen im Innern der Insel Viti Levu von Dr. Graffe. Festschr. aus die zureherische Jugend. Naturf. Gesellsch. Zurich. 70:46.
- . 1893. Revision du système des Orthoptères et Description des espèces rapportées par M. Leonardo Fea de Birmanie. Ann. Mus. Civ. Stor. Nat. Giacomo Doria. 1-230.
- Brunner v. Wattenwyl, K. and J. Redtenbacher. 1906-1908. Die Insekten familie der Phasmiden. Leipzig. 590 p.
- Burmeister, H. C. 1838. Handbuch der Entomologie. Berlin. 2:573-575.
- Carl, J. 1913. Phasmides nouveaux ou peu connus du Museum de Genève. Rev. Suisse Zool. 21:1-56.

⁴ Jean Guillaume Audinet Serville has been referred to by nearly all authors as 'Serville'; this is incorrect. In 1831 he published his name with a hyphen, 'Audinet-Serville', as author of his work.

- Carrera, M. 1960. Insecta amapaensis. *Diapherodes gibbosa* Burmeister 1839, tips de un novo gênero de Phasmida. Pap. Dep. Zool. Sec. Agric. São Paolo. 14:99-104.
- Caudell, A. N. 1903. The Phasmidae, or walking sticks of the U.S. Proc. U.S. Nat. Mus. 26:863-885.
- Chopard, L. 1912. Contribution à la faune des Orthoptères de la Guyane Française. Ann. Soc. Entomol. Fr. 80:315-350.
- Coquerel, C. 1861. Orthoptères Bourbon et Madagascar. Ann. Soc. Entomol. Fr. 1:495-500.
- Crampton, G. C. 1939. The interrelationships and lines of descent of living insects. Psyche. 45:165-182.
- Dohrn, H. 1910. Beitrag zur Kenntnis der Phasmiden. Stett. Entomol. Z. 71: 397-444.
- Drury, D. 1770. Illustrations of natural history. 3v. Orthoptera In v. 2. 1773.
- Essig, E. O. 1942. College Entomology. 908 p.
- Gray, G. R. 1833. The entomology of Australia. The monography of the genus *Phasma*. 28 p., 8 pls.
- _____. 1835. Synopsis of the species of insects belonging to the family of Phasmidae. 48 p.
- Günther, K. 1929. Die phasmiden der deutschen Kaiserin Auguste-Fluss Expedition 1912-1913. Mitt. Zool. Müs. Berl. 14:597-746.
- _____. 1932a. Beiträge zur Systematik und Geschichte der Phasmoidenfauna Ozeaniens. Mitt. Zool. Berl. 17:753-835.
- _____. 1932b. Die von Prof. Dr. H. Winkler 1924-1925. In Zentralborneo gesammelten Phasmoiden. Zool. Anz. 101:65-73.
- _____. 1935. Die von G. Heinrich 1930-1932 auf Celebes gesammelten phasmiden. Mitt. Zool. Mus. Berl. 21:1-34.
- _____. 1953. Über die taxonomische Gliederung und die geographische Verbreitung der Insektenordnung der Phasmatodea. Beitr. Entomol. 3:541-563.
- Gurney, A. B. 1947. Notes on some Remarkable Australian Walkingsticks. Ann. Entomol. Soc. Am. 40(3):373-396.
- de Haan, W. 1842-1844. Bijdragen tot de Kennis der Orthoptera. Verh. Nat. Geschied. Nedrl. Overz. Bezitt. v. 16-20, 24.
- Hebard, M. 1919. Studies in the Dermaptera and Orthoptera of Colombia. I. Trans. Am. Entomol. Soc. (Phila.). 45:89-179.
- _____. 1920. The genus *Timema* Scudder, with the description of new species (Orthoptera, Phasmidae, Timeminae). Entomol. News. 31:126-131.
- _____. 1921. Studies in the Dermaptera and Orthoptera of Colombia, II. Blattidae, Mantidae, Phasmidae. Trans. Am. Entomol. Soc. (Phila.). 47: 107-163.
- _____. 1937. Studies in Orthoptera which occur in North America north of the Mexican boundary. Trans. Am. Entomol. Soc. (Phila.). 63:347-379.
- Hennig, W. 1969. Die Stammesgeschichte der Insekten. Frankfurt. 436 p.
- Illiger, J. C. W. 1798. Kugelam: Verzeichnis der Käfer Preussens, ausgearbeitet von Illiger, mit einer Vorrede von Hellwig und dem angehangten versuch einer natürlichen Ordnung und Gattungsfolge der Insekten. Halle. Gebauer, 511 p.
- Jacobson, G. G. R. and V. L. Bianchi. 1902. Orthoptera and Psedoneuroptera of the Russian Empire. St. Petersb. 432 p.

- Karny, H. II. 1923. Zur Nomenklatur der Phasmoiden. *Treubia*. 3:230-242.
- Karsch, A. F. F. 1898. Vorarbeiten zu Orthopterologie Ost-Afrikas. 1. Phasmodea. *Entomol. Nachr.* 24:359-382.
- Kaup, J. J. 1871. Neue Phasmiden. *Berl. Entomol. Z.* 15:25-42.
- Kevan, D. K. McE. 1952. East African Blattodea, Phasmatodea, and Orthoptera, Ergebnisse der Deutschen Zoologischen Ostafrika Expedition 1951-1952. *Beitr. Entomol.* 5:472-485.
- Kirby, W. F. 1896. On some new or rare Phasmidae in the collection of the British museum. *Trans. Linn. Soc. Lond.* (2) *Zoology*. 447-476.
- _____. 1904a. *Synonymic Catalogue of Orthoptera*. 3v. London. Phasmidae. *In v. 1*.
- _____. 1904b. Notes on Phasmidae in the collection of the British museum (N. H.) with description of new species. *Ann. Mag. Nat. Hist.* (7) 13:372-377, 429-449.
- Kristensen, N. P. 1975. The phylogeny of hexapod "orders". A critical review of recent accounts. *Z. Zool. Syst. Evolutionsforsch.* 13:1-44.
- Latreille, P. A. 1817. Insectes, quatrième famille. Spectres, Spectra, p. 412. *In Cuvier, Le Règne Animal*, v. 3. Paris. 682 p.
- _____. 1825. Familles naturelles du règne Animal. Paris. 570 p.
- Latreille, P. A. Lepeletier de Saint-Fargeau, J. G. Audinet-Serville and J. F. Guérin. 1825. Encyclopédie méthodique. Dictionnaire des insectes. Histoire naturelle. Entomologie, An Histoire naturelle des crustacés, des arachnides et des insectes. 10. Paris 834 p. [Phasmatodea are entered under several alphabetical heading, some in v. 9.]
- Leach, W. E. 1814-1817. *Zoological Miscellany*. London, 3 v. Orthoptera. *In v. 2*. 1815.
- Le Guillou, E. J. F. 1841. Description des Orthoptères nouveaux, recueillis pendant son voyage de circumnavigation sur la Corvette Zélée. *Rev. Zool.* 292-295.
- Lichtenstein, A. A. H. 1796. Catalogus Musei Zoologici ditissimi Hamburgi. Sectio tertia: Insecta. 237 p.
- _____. 1802. A dissertation on two natural genera hitherto confounded under the name Mantis. *Trans. Linn. Soc. Lond.* 6:1-14.
- von Linné, C. 1788-1793. *System naturae*. Thirteenth edition by J. F. Gmelin. 3 v. Insects in v. 1, part 4, 1517-2224.
- Montrouzier, P. 1855. Essai sur la faune de l'île de Woodlark ou Moiou. *Ann. Soc. Agric. Lyon*. (2) 7:1-114.
- Moxey, C. F. 1971. Notes on the Phasmatodea of the West Indies: Two new genera. *Psyche*. 78:67-84.
- Navas, L. 1907a. Notas zoológicas 13. Insectos nuevos o recientemente descritos de la península ibérica. Zaragoza, Bol. Soc. Arag. 6:194-200.
- _____. 1907b. Algunos neuropteros y Ortopteros nuevos en Montserrat (Barcelona) y el Miracle (Lerida). *Rev. Montserratina*. p. 48.
- Olivier, A. G. 1789-1825. Encyclopédie méthodique. Dictionnaire des insectes. 10 v. Paris.
- Padewieth, M. 1900. Orthoptera genuina des Knoat. *Littorale und der Umgebung Fiumes*. Glas. Naravos. Druzt. 11:8-33.
- Pantel, J. 1915. Sur le genre Clonopsis n.g. *Bull. Soc. Entomol. Fr.* pp. 95-96.

- Ragge, D. R. 1955. The wing-venation of the order phasmida. *Trans. R. Entomol. Soc. London.* 106:375-392.
- Redtenbacher, J. See: Brunner v. Wattenwyl K. and Redtenbacher.
- Rehn, J. A. G. 1901. Some necessary changes in names of Orthoptera. *Can. Entomol.* 33:271-272.
- _____. 1904a. Studies in the Orthopterous family Phasmidae. *Proc. Acad. Nat. Sci. Phila.* 56:38-107.
- _____. 1904b. Notes on Orthoptera from Northern and Central-Mexico. *Proc. Acad. Nat. Sci. Phila.* 56:513-549.
- _____. 1938. A new proctryptic phasmid from Cuba (Orthoptera: Phasmatidae). *Proc. Acad. Nat. Sci. Phila.* 90:103-108.
- Rehn, J. A. G. and M. Hebard. 1938. New genera and species of West Indian Mantidae and Phasmidae (Orthoptera). *Trans. Am. Entomol. Soc. (Phila.).* 64:33-56.
- Rehn, J. A. G. and J. W. H. Rehn. 1939. The Orthoptera of the Philippine Islands. Part 1. Phasmatidae, Obriminae. *Proc. Acad. Nat. Sci. Phil.* 90:389-487.
- Rehn, J. W. H. 1938. Notes on the genus Haaniella with the description of a new species (Orthoptera: Phasmatidae). *Trans. Am. Entomol. Soc. (Phila.).* 64:367-371.
- de Saussure, L. F. H. 1868. Phasmidarum novarum species nonnullae. *Revue. Mag. Zool.* 20:63-70.
- _____. 1870. Mission scientifique au Mexique et dans L'Amérique Central. Part 6. *Recherches Zoologiques.* Paris. 539 p.
- Scudder, S. H. 1895. Summary of the U.S. Phasmidae. *Can. Entomol.* 27: 29-30.
- Sharov, A. G. 1968. Phylogeny Orthopteroidea (Filogeniya orthopteroidnykh) Tr. Paleontol. Inst. Akad. Nauk SSSR. 118:1-213.
- Sjöstedt, Y. 1918. Results of Dr. Mjöberg's Swedish Scientific Expedition to Australia 1910-1913. 17. Mantidae and Phasmidae. *Ark. Zool.* 11, 19:1-61.
- Snodgras, R. E. 1952. A Textbook of arthropod anatomy. Comstock Publ. New York. 363 p.
- Stål, C. 1859a. Orthoptera och Hemiptera from södra Afrika. *Oefv. K. Svens. Vetenskapsakad. Akad. Förh.* 15:307-320.
- _____. 1859b. Recensio Orthopterum part 2. *Revue Critique des orthopteres decrits par Linne, de Geer et Thunberg.* Stockholm. Phasmidae, v. 3. pp. 4-102.
- _____. 1875a. Recherches sur la système des phasmides. *Bih. Svens. Vetenskapsakad. Akad. Handl.* 2:1-19.
- _____. 1875b. Recensio Orthopterum part 2. *Revue Critique des Orthopteres décrits par Linné, de Geer et Thunberg.* Norstedt and Söner. Stockholm. Phasmidae. In v. 3. 4-102.
- _____. 1875c. Observations orthopterologiques. 1. Sur une systematisation nouvelle des phasmides. *Bih. K. Svens. Vetenskapsakad. Akad. Förh.* v. 3. 14:1-21.
- _____. 1877. Orthoptera nova ex insulis Philippines. *Öfv. K. Svens. Vetenskapsakad. Akad. Förh.* 10:1-74.
- Stoll, C. 1787. Representation Exactement coloree D'Apres nature des spec- tres, des mantis, des sauterelles, des grillons, des criquets et des blettes, qui

- se trouvent dans les quatre parties du monde, L'Europe, L'Asia, L'Afrique et L'Amérique; rassemblées et décrites par Caspar Stoll. Amsterdam. 42 p.
- Strohecker, H. F. 1951. Three new species of North American Orthoptera. Ann. Ent. Soc. Amer., 44:169-172.
- _____. 1962. A new *Timema* from Nevada and Arizona (Phasmidea: Timemidae). Pan-Pac. Entomol. 42:25-26.
- Tinkham, E. R. 1942. A new Californian species of *Timema* (Phasmidea: Timematidae) with zoogeographical notes. Bull. South Calif. Acad. Sci. 41: 72-79.
- Uvarov, B. P. 1940. Twenty-eight new generic names in Orthoptera. Ann. Mag. Nat. Hist. (11) 5:173-176, 6:112-117, 377-379.
- Westwood, J. O. 1830. Insectum arachnoidumque novarum. Decades dno, Zool. J. Lond. 5:440-453.
- _____. 1841-1845. Arcana Entomologica, or Illustrations of new rare and interesting exotic insects. 2 v.
- _____. 1860. Catalogue of orthopterous insects in the collection of the British Museum. Part 1. Phasmidae. 196 p.
- Wirth, W. W. 1971. A review of the "stick piks", neotropical flies parasitic on walking stick insects (Diptera: Ceratopogonidae). Entomol. News. 82:229-245.